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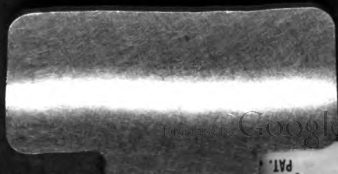
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RADIO SERVICE

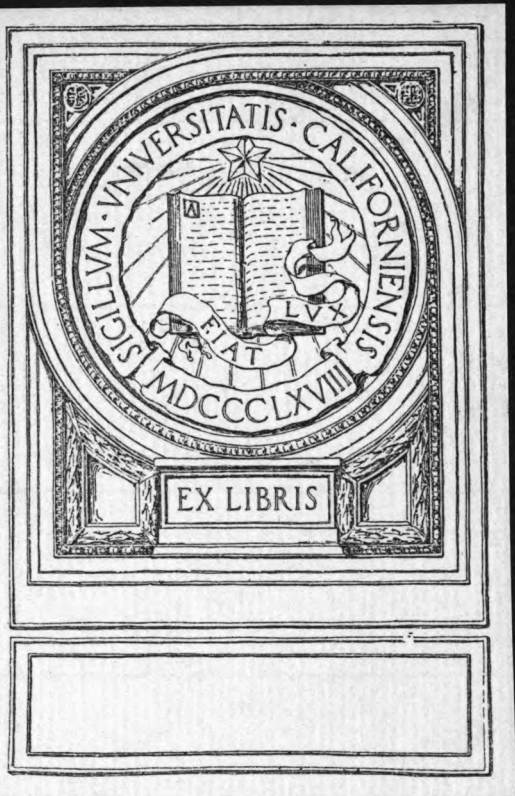
IMPORTANT EVENTS IN RADIOTELEGRAPHY

FEBRUARY 1, 1918



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**DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE**

IMPORTANT EVENTS IN RADIOTELEGRAPHY

FEBRUARY 1, 1916



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IMPORTANT EVENTS IN RADIOTELEGRAPHY.

PEAKS IN THE WAVES OF WIRELESS PROGRESS.

1831.

Farady discovered electromagnetic induction between two entirely separate circuits.

1838.

Steinheil discovered the use of the earth return.

1840.

Henry first produced high frequency electric oscillations, and pointed out that the discharge of a condenser is oscillatory.

1842.

Morse made wireless experiments by electric conduction through water.

1843.

Lindsay suggested that if it were possible to provide stations not more than 20 miles apart all the way across the Atlantic there would be no need of laying any cable.

1845.

Lindsay made experiments in transmitting messages across the River Tay by means of electricity or magnetism without submerging wires, using the water as a conductor.

1849.

Wilkins revived the same suggestions for wireless telegraphy. Dr. O'Shaughnessy succeeded in passing intelligible signals without metallic conduction across a river 4,200 feet wide.

4 **IMPORTANT EVENTS IN RADIOTELEGRAPHY.**

1862.

Heyworth patented a method of conveying electric signals without the intervention of any continuous artificial conductor.

1879.

Hughes discovered the phenomena on which depend the action of coherer. The coherer was later used practically by Marconi.

1880.

Trowbridge found that signaling might be carried on over considerable distances by electric conduction through the earth or water between places not metallically connected.

1882.

Bell experimenting with Trowbridge method on the Potomac River, resulted in the detection of signals at a distance of $1\frac{1}{2}$ miles.

Prof. Dolbear was awarded a United States patent in March, 1882, for wireless apparatus in connection with which he made the statement that "electrical communication, using this apparatus, might be established between points certainly more than one-half mile apart, but how much farther I can not say." It appeared that Prof. Dolbear made an approach to the method that was, subsequently in the hands of Marconi, to be crowned with success.

1883.

Fitzgerald suggested a method of producing electromagnetic waves in space by the discharge of a conductor.

1885.

Edison, assisted by Gilliland, Phelps, and Smith worked out a system of communication between railway stations and moving trains by means of induction and without the use of conducting wires.

1887.

Hertz showed that electromagnetic waves are in complete accordance with the waves of light and heat, and founded the theory upon which all modern radio signaling devices are based.

1892.

Branly devised an appliance for detecting electromagnetic waves, which was known as a coherer.

1894.

Rathenau experimented with a conductive system of wireless telegraphy and signalled through 3 miles of water.

1895.

Marconi's investigations led him to the conclusion that Hertzian waves could be used for telegraphing without wires.

1896.

Marconi lodged his application for the first British patent for wireless telegraphy.

1897.

November 1.—First Marconi station erected at the Needles, Alum Bay, Isle of Wight. Experiments were conducted covering a range of 14½ miles.

1898.

July 20 and 22.—Events of the Kingstown regatta in Dublin reported by wireless for Dublin newspaper from steamer *Flying Huntress*.

1899.

September and October.—Races between *Shamrock* and *Columbia* reported by wireless for New York Herald.

1900.

March.—Radio apparatus installed on R. M. S. *Kaiser Wilhelm der Grosse*.

1900-1905.

Between these years Dr. De Forest was granted numerous patents in the United States and other countries for inventions connected with wireless telegraphy.

1901.

December 12.—The letter "S" was received by Mr. Marconi from Poldhu, England, at St. John's, New Foundland.

Prof. R. A. Fessenden applied for United States patent on September 28 for "Improvements in apparatus for the wireless transmission of electromagnetic wave, said improvements relating more especially to the transmission and reproduction of words or other audible signals." It appears that in connection with this apparatus there was contemplated the use of an alternating current generator having a frequency of 50,000 per second.

Prof. Fessenden was granted a number of United States patents between 1899 and 1905 covering devices used in connection with radiotelegraphy.

1901-1904

It appears that during this period Dr. John Stone Stone was granted more than 70 United States patents covering radiotelegraphy.

1901-1905

More than 40 United States patents were granted to Harry Shoemaker covering certain apparatus used for radio communication.

1902.

February.—Steamship *Philadelphia*, American Line, received messages a distance of 1,551½ statute miles, and received Morse signals up to a distance of 2,099 statute miles from Poldhu station, Cornwall.

1903.

January 19.—President Roosevelt sent a transatlantic radiogram to King Edward via Cape Cod and Poldhu stations.

March 30.—First transoceanic Marconigram was published in the Times.

August 4.—First International Radiotelegraphic Conference was held at Berlin.

1904.

A wireless-telegraph act was passed by the British Government.

1905.

In October of this year erection of Clifden, Ireland, high-power radio station was commenced.

1906.

Dr. De Forest was granted a patent on January 18 for a vacuum rectifier, commercially known as the audion.

Second International Radiotelegraphic Conference was held at Berlin, and a convention was signed by a majority of the principal countries of the world.

1907.

October 17.—Marconi transatlantic stations at Clifden and Glace Bay were opened for limited public service.

1908.

February 3.—Transatlantic radio stations were opened to the general public for the transmission of messages between the United Kingdom and the principal towns in Canada.

In carrying out his invention Prof. Fessenden constructed a high-frequency alternator with an output of 2.5 kilowatts at 225 volts and with a frequency of 70,000 cycles per second. Later on Prof. Fessenden reported successful wireless telephonic communication between his station located at Brant Rock, Mass., and Washington, D. C., a distance of about 600 miles.

1910.

Messages received on the steamship *Principessa Mafalda* from Clifden, a distance of 4,000 miles by day and 6,735 miles by night.

June 24.—Act approved by the United States Government requiring radio equipment and operators on certain passenger-carrying vessels.

1911.

July 1.—Radio Service organized by Department of Commerce and Labor to enforce act of June 24, 1910.

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1912.

June 4.—Third Radiotelegraphic Conference opened at London, and approved important regulations to secure uniformity of practice in radiotelegraphic services.

July 23.—Act approved by the United States Government extending act of June 24, 1910, to cover cargo vessels, and requiring auxiliary source of power, efficient communication between the radio room and the bridge, and two or more skilled radio operators in charge of the apparatus on certain passenger-carrying vessels.

August 13.—Act approved by the United States Government to regulate radio communication. Under this act radio operators and transmitting stations are licensed.

1913.

November 12.—Safety at Sea Conference held in London. At this conference the use of radio received appropriate consideration.

November 24.—The first practical trials with wireless apparatus on trains were made, messages having been received and transmitted on board trains.

The wireless station at Macquerie Island was the means of keeping Dr. Mauson, the Australian explorer, in touch with the outer world. A small journal, the *Adelie Blizzard*, was established, the news being received by radio.

1914.

A new departure in the application of radiotelegraphy to the safety of life at sea was the equipment of the motor lifeboats of the steamship *Aquitania* with radio apparatus.

High-powered transoceanic stations were completed at Carnarvon, Wales, Belmar, Honolulu, and San Francisco during the autumn of 1914. The Honolulu-San Francisco stations were opened to public service September 24, 1914. The Tuckerton-Eilvese and Sayville-Nauen stations were in operation about this time.

Most of these stations made use of the latest developments in the art, using undamped and long waves as produced by the Poulsen arc and the radio-frequency alternator.

1915.

Great progress was made in the field of radiotelephony. In this country, the voice of a person speaking into the radiotelephone at Arlington, Va., was heard at Honolulu, Hawaii, and at Paris,

France. In Germany a system operating practically over several hundred miles was developed.

Ship service was greatly improved through the installation of new equipments, embodying features of great practical value, by various operating companies. Efficient emergency radio transmitters came into wider use, owing considerable to the efforts of the Radio Service of the Department of Commerce and its refusal to pass inefficient equipment. Such installations considered as essential are safeguards to shippers and the seagoing public.

SOME RECENT DEVELOPMENTS.

The passage of the act of August 13, 1912, to regulate radio communication, made necessary the development of special types of radio-measuring apparatus for the use of the radio inspectors. One of the most important of these measuring instruments was invented and developed by F. A. Kolster, of the Bureau of Standards, and is used to make direct measurements of wave length and logarithmic decrement. The instrument is unique in its design, and will be exhibited and demonstrated at the joint "safety-first" exhibit of the Bureau of Standards and Bureau of Navigation, to be held in Washington from February 21 to February 26, in the National Museum.

Several years ago Mr. Kolster realized the importance of radio signaling in its relation to safety of life at sea and to aids to navigation.

In the early part of 1913 Mr. Kolster submitted to an interdepartmental committee a memorandum pointing out the advantages of certain applications of radio signaling for use at lighthouses, lightships, and life-saving stations, especially in time of fog.

From then until the present time experiments have been conducted at the Bureau of Standards leading toward the development of suitable apparatus for this purpose.

The results of this work will be shown at the "safety-first" exhibit mentioned above. Actual working models of the experimental apparatus will be demonstrated. The apparatus is extremely simple, compact, easily installed and operated, and inexpensive. Recent experiments have developed a much wider field of application than at first contemplated.

10 **IMPORTANT EVENTS IN RADIOTELEGRAPHY.**

An outline of a few possible applications is as follows:

1. Installation at lighthouses, lightships, life-saving stations, and other important points will have a two fold value so far as safety at sea is concerned, especially in time of fog.

2. Set signals sent out by the automatic transmitters will enable vessels equipped with the special receiving devices accurately to determine their positions and ranges by triangulations.

3. Vessels equipped with ordinary radio transmitters may send out signals which when received by the lighthouses, or other especially equipped receiving stations, will enable the operator to advise the ship of its position.

4. Collisions of ships at sea in fog may be readily avoided by the use of this apparatus, which will determine direction and distance.

The Radio Inspection Service of the Department of Commerce contemplates the use of this device in all of its offices to locate amateur or other stations that are not observing the radio laws and regulations.

A comparatively small model is now installed in a room of the Bureau of Standards, with which messages are received from practically all high-powered stations in the United States and from Germany.

RADIO INSPECTION SERVICE.

The first act requiring radio apparatus on certain passenger-carrying vessels was approved June 24, 1910. Under this act the Secretary of Commerce and Labor organized on July 1, 1911, the Radio Service, composed of three inspectors, with headquarters at New York, N. Y., Baltimore, Md., and San Francisco, Cal.

The second act, approved July 23, 1912, amended the above act so as to cover all vessels navigating the ocean or the Great Lakes and licensed to carry or carrying 50 or more persons, including passengers or crew or both, with the exception of steamers plying between ports or places less than 200 miles apart. This act also requires an auxiliary source of power independent of the vessel's main electric power plant, which will enable the sending set for at least four hours to send messages over a distance of at least 100 miles; efficient communication between the operator in the radio room and the bridge; and that the radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or

the other of whom shall be on duty at all times while the vessel is being navigated, with the exception of cargo vessels, on which, in lieu of the second operator, a member of the crew competent to receive and understand distress calls and other calls indicating danger may be substituted to aid in maintaining a constant wireless watch, so far as required for the safety of lives.

The act to regulate radio communication was approved August 13, 1912. Under this act transmitting stations and radio operators are licensed by the Secretary of Commerce. Transmitting stations are inspected to determine if they comply with the requirements of the law. Radio operators are examined in order to determine their qualifications.

In addition to the above-mentioned acts, the Department also enforces the London International Radiotelegraphic Convention rules of 1912, to which the United States is a party.

Land radio stations are classified as follows: Public service, general; public service, limited; limited commercial; experimental; technical and training school; special amateur; general amateur; and restricted amateur.

Radio operators are classified as follows: Commercial extra first grade; commercial first grade; commercial second grade; commercial cargo grade; experimental and instruction grade; amateur first grade; and amateur second grade.

The use of radio apparatus on vessels carrying passengers or 50 or more in crew is now accepted as essential to the safety of those on board, which fact is clearly illustrated by the number of vessels voluntarily equipped with radio apparatus, and in order to enforce the laws the following force is engaged in this work:

In addition to the office force in the Bureau of Navigation, the field force now embraces one radio engineer, 12 inspectors, and 8 clerks, having headquarters as follows: Boston, Mass.; New York, N. Y.; Baltimore, Md.; Savannah, Ga.; New Orleans, La.; San Francisco, Cal.; Seattle, Wash.; Cleveland, Ohio; and Chicago, Ill.

WIRELESS AS A SAFEGUARD TO LIFE AT SEA.

The Bureau has a record of the following vessels equipped with radio apparatus, to which accidents have occurred during the past 15 years, wherein wireless played an important rôle in the saving of human life.

1899.

March 3.—Steamship *Matthews* ran into the East Goodwin Light-ship. The accident was reported by wireless, and lifeboats were sent to the relief of the lightship.

1901.

January 1.—Steamship *Princesse Clementine* reported the bark *Medora* waterlogged, resulting in a tug being sent to her assistance.

1903.

December 18.—Steamship *Kroonland*, Red Star Line, disabled; passengers saved great inconvenience by radio communication being established with Crookhaven.

1904.

During this year, accidents to the steamship *New York* and the steamship *Friesland* were reported by radio.

1907.

January 20.—Steamship *Preston* stranded on Courtown Gays, St. Andrews Island, about 170 miles from Port Limon, Costa Rica. Assistance was summoned by radio and all on board were saved.

April 10.—Steamship *Arapahoe* of Clyde Line, lost her propeller off Cape Henlopen, Del. The *Apache* and *Iroquois* responded to the wireless call for aid, and the vessel was towed to port.

May 8.—Steamship *Prinz August Wilhelm* stranded on Middle Ground, Kingston, Jamaica. Aid was secured by radio and the ship with all persons on board was saved.

1908.

March 25.—The steamship *Seminole* of the Clyde Line ran ashore at Point Pleasant, N. J., in a heavy fog. The vessel pounded heavily on the bottom, greatly alarming the passengers. The distress call was sent out, bringing wrecking tugs and life-saving crews to her assistance.

1909.

January.—The *Republic* was sunk in collision with the *Florida*; probably 1,500 lives saved by means of radio.

January 20.—Steamship *Hamilton*, of the Old Dominion Line, was in collision with a car barge of the New York, Philadelphia & Norfolk Railroad, in Hampton Roads. Distress call was sent out by radio, and in a short time tugs were towing the badly battered steamer back to port.

February 26.—United States revenue cutter *Mohawk* ran aground on Hog Back at Hell Gate. She was leaking badly, her bow resting on two bad rocks, which threatened to tear a hole in her bottom with the fall of the tide. Wireless distress calls were sent which brought powerful tugs and lighters to her assistance.

March.—*Horatia Hall* disabled in Lake Michigan; 150 persons were saved by means of radio.

The schooner *Ann J. Trainer* was sighted by the Egg Harbor, N. J., life-saving station, dismantled and in a sinking condition. Wireless distress signals were flashed, in response to which rescuing tugs came to her aid.

March 8.—*City of Racine* disabled in Lake Michigan; radio was instrumental in saving 200 lives.

June 10.—The steamship *Slavonia* was stranded in the Azores, and the passengers and crew, numbering 410, were rescued from the wreck by the assistance of vessels summoned to her aid by wireless.

June 27.—The steamer *City of South Haven*, of the Chicago & South Haven Steamship Co., had her rudder torn away en route from Chicago to South Haven, Mich., and was at the mercy of a heavy sea. Assistance was secured by radio and the vessel was towed to port; 100 passengers were on board.

June 29.—The steamer *Mackinaw*, of the Schubach-Hamilton Steamship Co., ran aground on the Yukon Flats. A wireless message to the steamship managers at St. Michael brought lighters to remove a portion of the cargo, after which the vessel was floated.

August 11.—The steamer *Arapahoe*, of the Clyde Line, while bound from New York for Charleston and Jacksonville, heavily laden and with many passengers on board, broke her tailshaft near Diamond Shoals and was helplessly drifting ashore. The distress call brought the steamship *Huron* to her assistance.

August 14.—The steamer *Helen*, of the Atlantic Fruit Co., went ashore off Poplar Island, Chesapeake Bay, while heavily laden with a perishable cargo of bananas. The *Helen* was not equipped with wireless, but was sighted by the tug *Savage*, which immediately sent a distress call, bringing out the necessary aid.

August 26.—The steamer *Ohio*, of the Alaska Steamship Co., while en route from Seattle, Wash., to Valdez, Alaska, via what is known as the inside passage, struck a rock at Steep Point, at the northern end of Finlayson Channel, British Columbia, sinking in 30 minutes. The SOS call had previously been sent out by Operator Egges, in response to which the steamships *Humboldt* and *Rupert City* came to the aid of the sinking vessel; of the 200 persons aboard only 5 lost their lives, Operator Egges being among the missing.

September 21.—The steamer *Caris*, of the Clyde Line, bound from New York to Wilmington, N. C., and Brunswick, Ga., with passengers and cargo, was compelled to come to anchor off Cape Hatteras when her machinery was disabled. Several ships responded to the SOS call, and the *Caris* was towed into port.

September 25.—The steamer *Zeeberg* ran ashore on the south jetty of St. John's Bar, near Jacksonville, Fla., and was pounding on the rocks when the Clyde liner *Arapahoe*, which was equipped with radio apparatus, sighted her distress signals, and sent the distress call which brought the necessary aid.

October 13.—The steamer *Georgia*, of the Goodrich Transit Co., was rendered helpless by the loss of her propeller blades in a heavy sea and high wind when off Kewaunee, Wis. A wireless message was sent asking for assistance, in response to which a tug was dispatched from the harbor which towed the *Georgia* into Kewaunee.

November 20.—The steamer *Breakwater*, of the Atlantic Fruit Co., ran ashore in a gale 6 miles from Diamond Shoals lightships. The radio station at Cape Hatteras received the distress messages from the lightship and summoned the wrecking tugs *Merritt* and *Coley*, which took off 30 persons before the vessel was ground to pieces by the shoals.

The steamer *Alliance*, of the California & Oregon Coast Co., lost her rudder at the entrance of Goose, Oreg.; tugs were summoned by radio and the vessel was towed into port.

November 22.—The steamer *Puritan*, of the Graham & Morton Transportation Co., when off Benton Harbor, Lake Michigan, in a winter gale, was disabled by breaking the steering gear, and the vessel was buffeted about in the rough seas. The steamer *Benton Harbor* and a tug were dispatched from Ludington, Mich., in response to the distress call sent, and the *Puritan* was towed to St. Joseph, Mich.

December 1.—The steamer *Nueces*, of the Mallory Line, while bound from New York for Key West and Galveston, ran aground on French Reef, off the Florida coast, in a thick rain squall. Wireless distress calls sent through the Key West station brought the *Lampasas* and the Government tug *Osceola* to her assistance.

December 27.—The steamer *Iroquois*, of the Clyde Line, while bound from New York to Jacksonville, Fla., lost her propeller just north of Frying Pan Shoals. Wireless distress calls brought responses from nine steamers. The *San Marcos*, of the Mallory Line, towed her to Charleston, S. C.

1910.

January 3.—The steamer *Algonquin*, of the Clyde Line, while bound from Boston for Galveston, broke her tailshaft off Cape Hatteras in a blizzard. The wireless distress call was sent, in response to which the *Apache* came to her assistance and towed the disabled vessel back to port.

January 7.—The steamer *Arizona*, of the Goodrich Transit Line, burst her cylinder heads during the night in the middle of Lake Michigan, and it was impossible to make progress through the ice flood. Wireless distress calls brought out the steamer *Indiana*, which towed her to dock in Chicago.

February 5.—The steamer *Kentucky*, a wooden vessel bound from New York to the Pacific coast, via Cape Horn, to enter the Tacoma-Alaska service, sprung a leak off Cape Hatteras. The steamer *Alamo* responded to the distress call and reached the spot just in time to prevent the captain and 46 men aboard the *Kentucky* from going down with her.

April 13.—The steamer *Santa Clara*, of the North Pacific Steamship Co., foundered off the coast of California. Before the vessel sank, 95 persons were taken off by the tug *Ranker*, which was summoned by the wireless distress call.

May 9.—The steamer *Preston*, of the United Fruit Co., plying between Mobile, Ala., and Central America, lost her propeller and was rendered helpless. A wireless message to Mobile notified the home office of the trouble, which was soon remedied.

July 20.—The steamer *Huallaga*, of the Peruvian Dock & Steamship Co., plying between Panama and Peruvian ports, was burned at sea off the north coast of Peru; no passengers' lives were lost, but three of her seamen perished. The SOS call sent brought out

the steamship *Ucayali* in time to transfer the passengers and remainder of the crew.

July 23.—The steamer *Momus*, of the Southern Pacific Co., bound from New York to New Orleans, took fire south of Cape Hatteras. Capt. Boyd after fighting the fire several hours summoned aid by means of wireless, the steamship *Comus* responding, which resulted not only in the saving of many lives, but also in saving the cargo and ship, which were valued at \$3,000,000.

September 21.—The steamer *Western States*, of the Detroit & Buffalo Steamship Co., while on her eastern trip from Detroit to Buffalo, was disabled off Long Point, Canada, in Lake Erie. By means of the wireless station on board her captain was enabled to communicate with her owners, who promptly sent relief to the helpless ship.

October 18.—The Wellman dirigible balloon "America" was helplessly drifting over the Atlantic Ocean when the radio operator on the Royal Mail steamship *Trent* caught the wireless call for help sent from mid-air and rescue soon followed. News of the rescue was flashed to shore stations 500 miles distant and was soon published in all the newspapers.

October 28.—The steamer *Charles Nelson*, of the Chas. Nelson Lumber Co., went ashore a few miles north of Point Arena, Cal., in a thick fog. A distress call was sent which resulted in bringing the United States revenue cutter *McCullough* to her assistance.

December 1.—The steamer *Northwestern*, of the Alaska Steamship Co., was wrecked off Falee Bay, San Juan Island, Wash., while bound from Seattle to Cordova, Alaska. The steamer *Tees* responded to the SOS call and all on board were saved.

December 10.—The steamer *Olympic*, of the Alaska Steamship Co., was wrecked on a reef off Bligh Island, Alaska. Government launches answered the SOS call and 123 persons were saved.

1911.

(No date.) H. M. S. *Cornwall* reported by radio as being ashore at Cape Sable, Nova Scotia, and the Donaldson liner *Saturnia* as having struck an iceberg 175 miles east of Belle Isle. Both vessels were brought safely to port.

January 2.—Capt. McGray, of the steamer *Herman Frasch*, was stricken with ptomaine poisoning and at the point of death. A wireless message was promptly sent to physicians of the United

States naval stations at Dry Tortugas, Fla., about 100 miles away. The operator on the *Merida*, which was leaving the harbor of Progreso, Yucatan, about 800 miles away, caught Capt. McGray's message asking for a prescription and method of treatment. The reply written by the surgeon on the *Merida* was received on board the *Herman Frasch* before the naval station at Dry Tortugas, Fla., could respond. Capt. McGray, following directions, prepared a remedy from his medicine chest, and soon recovered.

January 25.—The steamer *Queen*, of the Pacific Coast Steamship Co., while off Point Reyes, Cal., discovered fire in her forward hold. The distress call brought four steamers to her assistance and the crew and 87 passengers were saved.

January 26.—The steamer *Cottage City*, of the Pacific Coast Steamship Co., was wrecked on a reef off Quadra Island, North British Columbia, in a blinding snowstorm and heavy fog. The SOS call brought aid from Victoria, British Columbia, and Port Townsend, Wash., and all on board were rescued.

April 11.—The steamer *Asia*, of the Pacific Mail Steamship Co., sank off Finger Rock, South China. Her wireless distress signals were answered by the *American Maru* and the Chinese vessel *Shang Siu*. The passengers and crew and the mails were saved.

May 12.—The steamer *Merida*, of the Ward Line, while off the Virginia Capes in a heavy fog, bound for New York from Vera Cruz and Habana, was struck amidships by the *Admiral Farragut*, bound from Philadelphia for Jamaica. The wireless distress call was sent out and responded to by the steamship *Hamilton*, to which vessel all persons on board the two colliding ships were transferred before the *Merida* sank and the *Admiral Farragut* helplessly disabled.

June 15.—The steamer *Western States*, of the Detroit & Buffalo Steamship Co., was disabled by the blowing out of a cylinder head while in the middle of Lake Erie, bound for Buffalo. Two vessels responded to the distress call, and all the passengers, 200 of whom were members of the Michigan Bankers' Association, were saved.

December 13.—The steamship *Delhi* was reported in distress off Cape Spartel. Assistance was obtained by wireless and all on board were safely landed.

1912.

April 15.—Steamship *Titanic*, White Star Line, was wrecked. The assistance secured by wireless resulted in the saving of 703 lives.

(No date.) The steamship *Advance*, of the Panama Line, with 70 passengers on board, had part of pilot house and bridge torn away. The SOS call brought assistance from three liners and a vessel of the Revenue-Cutter Service.

October 18.—Steamship *Camino* sailed from Portland, Oreg., and ran into an 80-mile gale. Heavy seas swept the decks and the terrified passengers gathered in the salon praying and weeping. The gale raged all night and at 5.30 a. m. of October 19 the propeller dropped to the bottom of the sea from the broken shaft. The vessel was at this time 15 miles off shore with the wind carrying her farther to sea. The SOS call was answered by the steamship *Watson* and in three hours the *Watson* was standing by ready to render relief.

1913.

January 16.—The steamship *Veronese* was wrecked on the Boa Nova Rocks about a half mile outside Leixoes Harbor. The SOS signal was sent out and, through the aid thus secured, all but a few of the passengers were rescued.

April.—The *Texas*, bound from Christiansand to Galveston, lost her propeller and rolled helplessly about in a heavy sea for a day and a night. The *C. F. Tietgen*, of the Scandinavian-American Line, responded and effected a successful rescue.

The *Robert Dollar*, while crossing the Columbia River bar, struck heavily, and later discovered that her rudder had been broken off, leaving her helpless in a big sea and a high wind. The SOS call was sent out, and a tug in the vicinity was despatched, which made a rescue within a few hours.

June 10.—The steamship *Olinda*, of the Munson Line, with five passengers and crew, caught fire at sea. In response to the SOS call, the U. S. S. *Nashville* went to her assistance. All the passengers were safely carried away.

July 24.—The *Millinocket* collided with the *Persian*. A tug and lighter were summoned by wireless and the vessel was docked.

August 18.—The steamer *State of California* crashed onto a reef in Gambier Bay, Alaska, and sank within three minutes. Donal C. Perkins sent the SOS call, which was picked up by the *Jefferson*, and the survivors, who were in lifeboats and on rafts, upon the arrival of the *Jefferson* at the scene of the disaster, were rescued with very little difficulty.

September 29.—The steamship *Templemore*, on a voyage from Baltimore to Liverpool, caught fire. In answer to the SOS call all steamers in her vicinity came to the rescue and all on board were saved.

October.—The *Templemore* again caught fire and completely burned. Fifty-four lives were saved by the Hamburg-American liner *Arcadia*.

The steamship *Berkshire* was burned off Lookout Cove, N. C. The distress call was heard at Wilmington, 164 miles away, by the revenue cutter *Seminole*, which reached the scene of the disaster in time to take off all the passengers, and after the flames were extinguished the following day, the vessel was towed to a safe anchorage.

October 3.—The *Spokane* went ashore on the beach off Cape Lazo, British Columbia, and summoned by wireless the freighter *La Touche*. The steamships *Dolphin*, *Minnesota*, and *Alki* also responded, but their assistance was not needed.

October 11.—The steamship *Volturno* was burned in mid-ocean, and in response to the wireless appeal 10 vessels came to her rescue and 521 lives were saved.

October 15.—The *Merced* was wrecked on Point Gorda, Cal., and completely destroyed. There were three replies to the SOS sent out, the *Atlas*, being the first vessel to arrive, safely transferred all on board the doomed vessel from the small boats.

October 23.—The *Stanley Dollar* struck the Viti Rocks on the Pacific coast. The distress call was responded to by the *Tahoma* and the wrecked ship was successfully hauled off the rocks on October 25.

October.—The steamship *Pleiades* met in collision with an unknown steamship off the Pacific coast. The wireless appeal for the assistance of a tug met with prompt response and the *Pleiades* reached port safely.

November 1.—The steamship *Norwega*, when 95 miles south of Hatteras, collided with the schooner *Glenlui*, tearing a hole in her side of such enormous size that she rapidly filled with water. Assistance was summoned by radio, a passenger vessel, two revenue cutters, and a battleship responding, and all on board were saved.

November 12.—The steamship *Oravia* ran on the rocks off the Falkland Islands. Assistance was called by radio and the passengers and mails were saved before the vessel was lost.

November 16.—The steamship *Balmes* caught fire. The steamship *Pannonia* responded to the SOS call, and 125 lives were saved. At the time of this rescue, the crew of the *Balmes* was reduced to the last degree of exhaustion, and the firemen lay about the deck so overcome, as the result of asphyxiation, that they had to be relieved every 15 minutes.

November.—Great Lakes storms destroyed 19 vessels, none of which were equipped with wireless. All vessels having radio apparatus installed received warning of the coming storm and sought safety.

1914.

January 4.—The steamship *Oklahoma* broke midships 75 miles south of Sandy Hook. Reaching out over miles of mountainous seas the distress call, which was flashed by radio, brought rescuing vessels, which were responsible for the saving of 13 out of the 40 persons on board the wrecked vessel.

January 13.—The Royal Mail Steamship Packet Co.'s steamship *Cohequid* was stranded on Trinity Rock, in the Bay of Fundy, and 36 hours after the first wireless calls for help were sent out the 108 persons on board were rescued.

January 26.—The yacht *Warrior*, owned by Frederick W. Vanderbilt, ran aground near Savanilla, on the coast of Columbia. Assistance was summoned by radio and the owner and his guests were taken off the stranded yacht by the *Almirante*.

January 30.—The steamship *Monroe* collided with the steamship *Nantucket*; 85 lives were saved as a result of the distress call sent out by Operator Kuehne, who gave his life belt to a woman, himself sinking in the icy water some time later, thus having given his life to save another.

February.—The lumber schooner *Yellowstone*, in distress in a storm off the Pacific coast, hailed a passing vessel and asked that a wireless call for assistance be sent out. This was done, and another lumber vessel responded and succeeded in towing the *Yellowstone* to San Francisco.

The *Pectan* ran aground off Adams Cove, Cal. Three vessels responded to the wireless distress call and succeeded in pulling the wrecked ship off the rocks.

The cargo schooner *Frank B. Witherbee* was badly damaged and in a sinking condition when her signal of distress was sighted 10 miles off Highland Light. A wireless appeal flashed to the Reve-

nue-Cutter Service brought out the *Itasca*, and all on board were rescued and the wrecked vessel safely towed to Boston Harbor.

March 17.—The *City of Sydney* was stranded on rocks near Halifax, Nova Scotia. The distress call was sent by radio, the tug *Rosemary* responding, resulting in the saving of the lives of all on board, numbering 53 persons.

May 3.—The *Columbian* was destroyed by fire in mid-ocean. Three vessels, the *Franconia*, the *Manhattan*, and the *Seneca*, responded to the SOS call and 31 lives were saved.

May 29.—The steamship *Empress of Ireland* collided with the collier *Storstad*. In response to the radio call for assistance the steamship *Lady Evelyn* and steamship *Eureka* rendered considerable aid, resulting in the saving of nearly 500 lives.

June 5.—The *Northland* ran aground on Bartletts Reef and wireless was used to call the wrecking tug *Tasco*, which proceeded promptly to the scene of the accident.

October 28.—The steamship *Proteus* sent SOS call, which was answered by the revenue cutter *Miami*. Later found that assistance was not needed, however.

December 8.—The steamship *Momus* sent out SOS call because of steering gear being damaged. The tug *El Ray* went to her rescue.

December 11.—The steamship *Centralia* requested assistance by radio. The steamships *Harvard* and *Bear* responded to the distress call.

December 19.—The steamship *Isthmian* struck rocks off San Benito Island. In response to the SOS call the cruiser *West Virginia*, torpedo boat destroyer *Perry*, and the Navy tug *Iroquois* proceeded to the rescue.

December 22.—The steamship *Honolulu* ran aground. The accident was reported by wireless, and six tugs went to her aid.

1915.

January 1.—The steamship *Obidense* struck Shipwash Sands. Call for assistance was sent by radio, and several ships responded, resulting in the saving of the entire crew, numbering 42 persons.

January 8.—The yacht *Wativa* ran ashore on breakwater at Tampico, Mexico. Wireless call was responded to by several ships and all on board were saved.

January 13.—The steamship *Colorado*, Wilson Line, reported to her agents by radio she had been damaged in collision. She was

able to return to port under her own steam, however, assistance not being required.

January 18.—The steamship *Camino* was helplessly adrift at sea. The Canadian Government steamer *Lady Laurier* and other vessels which heard her call for aid proceeded to the rescue.

January 24.—The steamship *Washington* was sunk by schooner *Elizabeth Palmer*. One life was lost, and 53 persons were rescued by the steamship *Hamilton*, of the Old Dominion Line, which responded to the distress call.

February 4.—The steamship *Iowa* was crushed by an ice jam off Chicago Harbor. Tugs were summoned by wireless and the entire crew of 25 was saved.

February 19.—The steamship *Santa Marta* lost rudder in a gale and was in need of immediate assistance. The SOS call summoned the necessary aid.

March 6.—Steamship *La Touraine*, bound from New York to Havre, with an inflammable cargo, was discovered on fire on the morning of March 6. The vessel was 400 miles west of the Irish coast. The SOS call was answered by the steamships *Arabic*, *Cornishman*, *Swanmore*, and *Rotterdam*. The fire was finally gotten under control by the crew. However, the *Rotterdam* remained near by ready to take off the passengers of the *La Touraine* should this be found necessary. The appeal for help was heard by a British cruiser, which vessel also responded to the call for assistance, but when she reached the *La Touraine* assistance was not necessary. The *La Touraine* was convoyed as far as Prawle Point by the steamship *Rotterdam*, and two French cruisers escorted the injured vessel as far as Cherbourg.

March 18.—The steamship *Santa Ana* was disabled on account of boiler trouble off Kodiak Island, Alaska. The steamship *Windber* responded to the SOS call, and no lives were lost.

March 23.—The steamship *Denver*, of the Mallory Line, when 1,300 miles from New York, sunk: Ten vessels responded to the SOS call, and all on board, numbering 65 persons, were saved.

March 30.—The steamship *Balmes* was stranded on reef 30 miles west of Key West, Fla. A call for assistance was sent by radio and all on board were saved.

April 11.—The steamship *Minnesota* was stranded at entrance to Japanese Inland Sea. Three vessels responded to the SOS call, and the ship, with all on board, was saved.

April 29.—The *Edgar H. Vance* was in danger of sinking just outside San Francisco Harbor on account of rudder breaking. A distress call was sent by radio and the vessel responding brought the necessary assistance; no lives were lost.

May 7.—The steamship *Lusitania* was torpedoed by a German submarine 10 miles from Kinsale, Ireland. Several ships responded to the SOS call, and 754 lives were saved.

May 18.—The steamship *Standard*, while out at sea in latitude 22° 50' north, longitude 88° 18' west, discovered fire in oil-fuel bunkers. Assistance was summoned by radio. Four vessels responded, and the *Bradford* towed the disabled vessel into Key West.

May 26.—Collision between the Holland-American liner *Ryndam* and the fruit steamer *Joseph J. Cuneo*, south of Nantucket Shoals. The SOS call was answered by the battleships *South Carolina*, *Texas*, *Louisiana*, and *Michigan*. The *South Carolina* took aboard the 230 passengers of the *Ryndam* who had been transferred to the *Cuneo*. No lives were lost.

May 31.—The steamship *Seward*, when 35 miles off Cordova, Alaska, listed badly on account of shifting of cargo. Two ships, 50 and 80 miles distant, answered immediately. All on board were saved.

June 3.—The steamship *Alliance* was stranded at Richmond Beach, Wash. Tugs responded to the SOS call and all on board, numbering 40 persons, were hauled off successfully.

June 9.—The steamship *A. W. Perry* ran ashore at Chebucto Head, Nova Scotia. Shore stations answered call for aid, and arranged relief vessels. All on board, numbering 82 persons, were saved.

June 13.—The *Bunker Hill* collided with yacht *Venadis* off Eaton's Neck, Long Island Sound, as a result of which two persons were killed and several were injured. Aid was called for by radio, and the remainder of the passengers and crew were saved.

June 28.—The *California* ran ashore at Tory Island. The distress call was sent by radio, and a British destroyer responded, bringing the necessary assistance.

July 10.—The pilot boat *New Jersey* was rammed and sunk by the United Fruit steamer *Manchioneal* at the eastern entrance to Ambrose Channel. The steamship *Manchioneal* saved the crew, but the SOS calls sent out brought assistance which was not needed.

July 11.—The *Invermore* was wrecked near Brig Harbor, Labrador. The distress call was sent by radio and the necessary aid was obtained.

July 22.—The steamship *Sucha*, while on fire in the Gulf of St. Lawrence, signaled for help by wireless, which was received by the *Royal George*, and which vessel proceeded to the rescue of the *Sucha*, but later received word by wireless that the fire had been put out and that help was not needed.

August 2.—The steamship *Georgian* went aground off Duxbury Reef. The steamship *Harvard* responded to the SOS call and all on board were saved.

August 4.—The *Emma Angel* was storm-battered and water-logged 45 miles southeast of the Highlands, and signaled to the *Bermudian* near by, which sent a wireless distress call, to which the *Seneca* responded, and all on board were saved.

August 18.—The *El Sud* grounded on Galveston Bar. The tug *Senator Bailey* responded and brought the necessary assistance.

August 30.—The *Edith*, of the Alaska Steamship Co., when 40 miles northeast of Cape St. Elias, listed badly on account of shifting of cargo of copper concentrates. The SOS call brought the necessary aid and all on board were saved. The fate of the vessel, however, has not been definitely learned.

September 19.—The steamship *Athinai* was destroyed by fire in mid-ocean, latitude 40° 54' north, longitude 58° 47' west. The *Tuscania* and *Romanian Prince* responded, resulting in the saving of 470 lives.

October 8.—The steamship *Mariposa* grounded and sank on rocky shore in Llama Passage, off Pointer Island, British Columbia. The SOS call was heard by two vessels. The *Despatch*, being within 30 miles, responded and safely carried off the 139 persons on board.

November 2.—The steamship *Santa Clara* was wrecked on jetty at Coos Bay, Oreg. Wireless succeeded in bringing out a vessel to the aid of the wrecked ship, and 93 persons were saved.

November 5.—The steamship *Fort Bragg* grounded in Gulf of California. The U. S. S. *San Diego* responded to the distress call, and 47 persons were saved.

November 8.—The steamship *Rochambeau* caught fire at sea and sent SOS call by wireless; later, however, she sent another message stating that fire was under control.

November 27.—The steamship *Thessaloniki* sprung a leak about 400 miles southeast of Sandy Hook. Several vessels responded to the distress call, and 300 persons were saved.

December 1.—The steamship *Minnesota*, when 760 miles south of San Francisco, sent wireless stating that machinery was disabled. The necessary aid was rendered by the *Iroquois* and the tug *Dauntless*, which responded promptly upon hearing the distress call.

1916.

January 24.—The newspapers report the British steamship *Pollentia* in distress about 700 miles off Cape Race, according to a wireless message which has been received at Halifax, Nova Scotia. The captain and crew of the *Pollentia* were saved by boats from the *Giuseppe Verdi*. In response to the wireless signals for help, several steamers came to her rescue, and for four days the *Giuseppe Verdi* stood by, giving such assistance as possible. At no time was there any hope of saving the *Pollentia*, but attempts to take off the crew were deferred because of the gale and tremendous seas. It was finally possible to rescue all on board the *Pollentia* and soon thereafter the disabled vessel sank.





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